

# Health Literacy Associated with Poor Adherence to Clinical Recommendations in Head and Neck Cancer Patients

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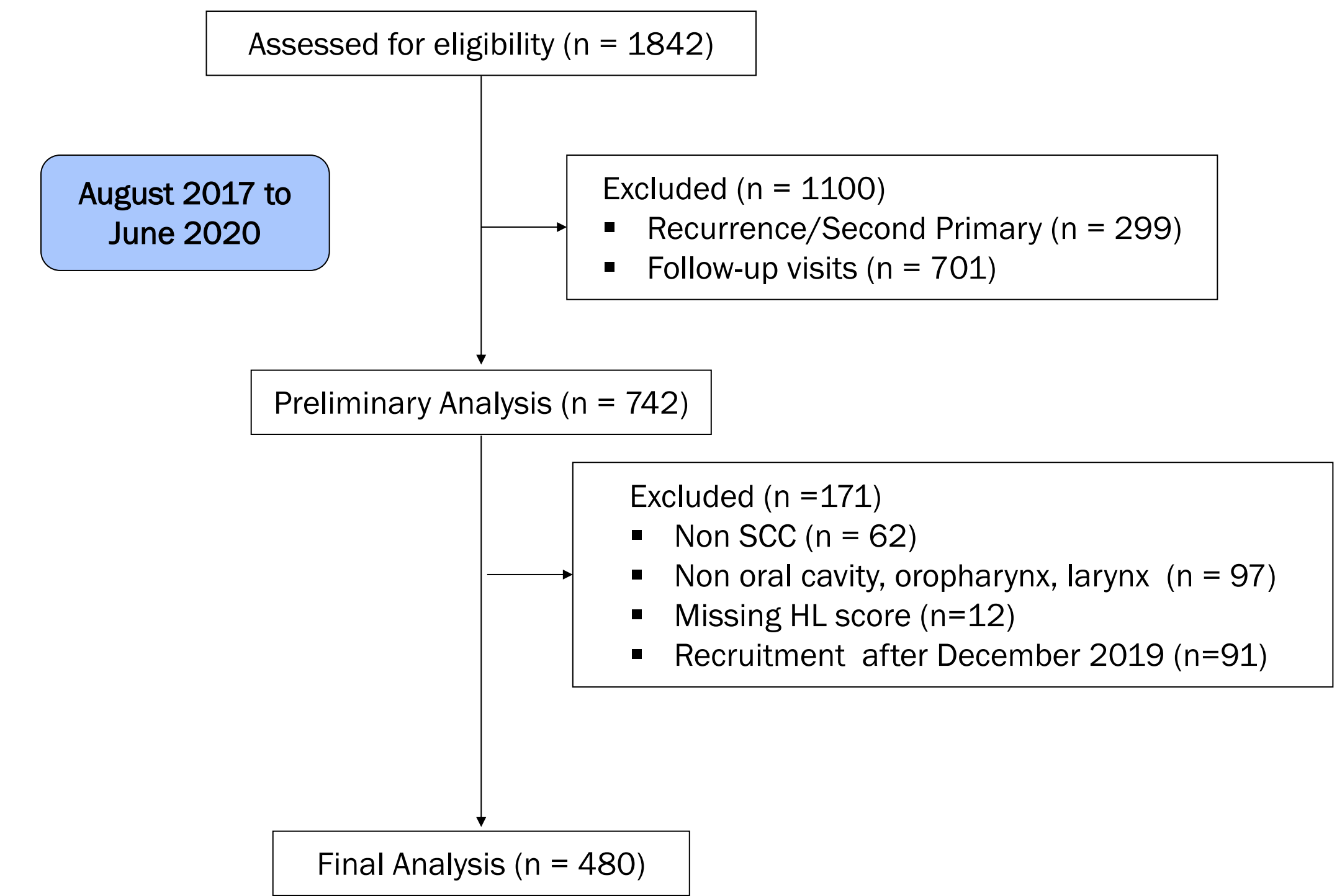
## 1 – INTRODUCTION

Health literacy is defined as an individual’s ability to understand and utilize health information to make informed medical decisions and follow treatment recommendations. In recent years, special attention has been paid to this concept in the context of head and neck cancer (HNC) survivorship. Many survivors suffer from treatment-related side effects following HNC therapy such as dysphagia, shoulder disability, and lymphoedema that often require speech-language pathology therapy (SLP) and/or physical therapy (PT). If left untreated, these symptoms can lead to significant functional impairment and have been shown to negatively impact quality of life. Here we explore how patient health literacy relates to adherence to treatment recommendations amongst HNC survivors.

## 2 – METHODS

We conducted a retrospective analysis of adult HNC survivors ( $\geq 18$  years) attending a multidisciplinary HNC survivorship clinic between 2017 and 2020. Health literacy was evaluated with the Brief Health Literacy Screen (BHLS), which is a three-item questionnaire that has been validated to identify patients with inadequate health literacy. A score of nine or less indicates an inadequate level of health literacy. All statistical analyses were performed using Stata/SE version 16.0 for Mac. Cohort was dichotomized into adequate and inadequate health literacy groups and population characteristics were compared using Pearson’s chi-square test or t-test for categorical and continuous variables, respectively. Univariate and multivariate logistic regression was used to evaluate association between health literacy and adherence to PT or SLP evaluation.

**Table 1. CONSORT Diagram**



## 3 – DEMOGRAPHICS

Health literacy groups were significantly different with respect to age, primary tumor site, and HPV status. There was no significant difference in PT or SLP recommendations by health literacy group.

**Table 1. Demographics and Clinical Characteristics**

|                               | Overall     | Adequate Health Literacy | Inadequate Health Literacy | p value |
|-------------------------------|-------------|--------------------------|----------------------------|---------|
| <b>Variables:</b>             | n=480       | n=397                    | n=83                       |         |
| <b>Age, y, mean (SD)</b>      | 62.9 (10.3) | 62.4 (10.2)              | 65.2 (10.5)                | 0.015   |
| <b>Gender, n (%)</b>          |             |                          |                            | 0.292   |
| Female                        | 114 (23.8)  | 98 (24.7)                | 16 (19.3)                  |         |
| Male                          | 366 (76.3)  | 299 (75.3)               | 67 (80.7)                  |         |
| <b>Race, n (%)</b>            |             |                          |                            | 0.755   |
| White                         | 443 (92.3)  | 368 (92.7)               | 75 (90.4)                  |         |
| Black                         | 24 (5)      | 18 (4.5)                 | 6 (7.2)                    |         |
| Other                         | 5 (1)       | 4 (1)                    | 1 (1.2)                    |         |
| Unknown                       | 8 (1.7)     | 7 (1.8)                  | 1 (1.2)                    |         |
| <b>Marital Status, n (%)</b>  |             |                          |                            | 0.065   |
| Married                       | 322 (67.1)  | 270 (68)                 | 52 (62.7)                  |         |
| Divorce/Single/Widowed        | 151 (31.5)  | 122 (30.7)               | 29 (34.9)                  |         |
| Unknown                       | 7 (1.5)     | 5 (1.3)                  | 2 (2.4)                    |         |
| <b>Tumor site, n (%)</b>      |             |                          |                            | 0.032   |
| Oral cavity                   | 137 (28.5)  | 111 (28)                 | 26 (31.3)                  |         |
| Oropharynx                    | 252 (52.5)  | 218 (54.9)               | 34 (41)                    |         |
| Larynx                        | 91 (19)     | 68 (17.1)                | 23 (27.7)                  |         |
| <b>HPV status, n (%)</b>      |             |                          |                            | 0.031   |
| Negative                      | 33 (6.9)    | 27 (6.8)                 | 6 (7.2)                    |         |
| Positive                      | 212 (44.2)  | 186 (46.9)               | 26 (31.3)                  |         |
| Unknown                       | 235 (49)    | 184 (46.4)               | 51 (61.5)                  |         |
| <b>Treatment, n (%)</b>       |             |                          |                            | 0.473   |
| Chemoradiation                | 144 (30)    | 117 (29.5)               | 27 (32.5)                  |         |
| Surgery alone                 | 100 (20.8)  | 87 (21.9)                | 13 (15.7)                  |         |
| Radiation alone               | 22 (4.6)    | 20 (5)                   | 2 (2.4)                    |         |
| Surgery + adjuvant            | 175 (36.5)  | 140 (35.3)               | 35 (42.2)                  |         |
| Unknown                       | 39 (8.1)    | 33 (8.3)                 | 6 (7.2)                    |         |
| <b>Treatment Stage, n (%)</b> |             |                          |                            | 0.35    |
| Post-Treatment                | 321 (66.9)  | 260 (65.5)               | 61 (73.5)                  |         |
| Pre-Treatment                 | 26 (5.4)    | 23 (5.8)                 | 3 (3.6)                    |         |
| Active Treatment              | 133 (27.7)  | 114 (28.7)               | 19 (22.9)                  |         |
| <b>Recommended PT, n (%)</b>  |             |                          |                            | 0.454   |
| yes                           | 255 (53.1)  | 214 (53.9)               | 41 (49.4)                  |         |
| no                            | 225 (46.9)  | 183 (46.1)               | 42 (50.6)                  |         |
| <b>Recommended SLP, n (%)</b> |             |                          |                            | 0.525   |
| yes                           | 153 (31.9)  | 129 (32.5)               | 24 (28.9)                  |         |
| no                            | 327 (68.1)  | 268 (67.5)               | 59 (71.1)                  |         |

## 4 – ADHERENCE TO TREATMENT RECOMMENDATIONS

Overall adherence to therapeutic recommendation was 65.9% and 69.3% for PT and SLP respectively. To evaluate adherence to PT/SLP by health literacy level, cohort was dichotomized to adequate health literacy group (BHLS score  $>9$ ) and inadequate health literacy group. Those with inadequate health literacy were significantly less likely to adhere to PT recommendations but were equally as likely to adhere to SLP recommendations.

**Table 2. Completion of Initial PT or SLP Evaluation by Health Literacy Group**

|                                    | Total       | Adequate Health Literacy | Inadequate Health Literacy | p values |
|------------------------------------|-------------|--------------------------|----------------------------|----------|
| <b>Variables:</b>                  | n=480       | n=397                    | n=83                       |          |
| <b>PT Eval, n (%)</b>              |             |                          |                            | 0.031    |
| yes                                | 168 (65.9)  | 147 (68.7)               | 21 (51.2)                  |          |
| no                                 | 87 (34.1)   | 67 (31.3)                | 20 (48.8)                  |          |
| <b>SLP eval, n (%)</b>             |             |                          |                            | 0.762    |
| yes                                | 106 (69.3)  | 90 (69.8)                | 16 (66.7)                  |          |
| no                                 | 47 (30.7)   | 39 (30.2)                | 8 (33.3)                   |          |
| <b>Days to PT eval, mean (SD)</b>  | 20.8 (21)   | 20.9 (20.9)              | 20.2 (22.8)                | 0.458    |
| <b>Days to SLP eval, mean (SD)</b> | 16.6 (15.1) | 17.5 (16)                | 12.2 (7.7)                 | 0.134    |

For categorical variables, p value calculated with chi-square test

## 5 – REGRESSION

Likelihood of adherence to treatment recommendations by health literacy group was further evaluated via logistic regression. On univariate analysis those with inadequate health literacy were half as likely to adhere to PT recommendation but were not significantly less likely to adhere to SLP. After adjusting for demographic and clinical characteristics, inadequate health literacy was independently associated with decreased likelihood to adhere to treatment recommendations.

**Table 3. Likelihood to Complete Initial PT Evaluation**

|                              | Univariate Logistic Regression (n=255) |         | Multivariate Logistic Regression <sup>a</sup> (n=252) |         |
|------------------------------|----------------------------------------|---------|-------------------------------------------------------|---------|
| <b>Health Literacy Level</b> | OR (95% CI)                            | p value | OR (95% CI)                                           | p value |
| Adequate                     | Reference                              |         | Reference                                             |         |
| Inadequate                   | 0.48 (0.24-0.94)                       | 0.033   | 0.47 (0.23-0.99)                                      | 0.048   |

<sup>a</sup>Adjusted for age, gender, race, marital status, tumor site, HPV status, treatment modality, and stage in treatment.

**Table 4. Likelihood to Complete Initial SLP Evaluation**

|                              | Univariate Logistic Regression (n=153) |         | Multivariate Logistic Regression <sup>a</sup> (n=150) |         |
|------------------------------|----------------------------------------|---------|-------------------------------------------------------|---------|
| <b>Health Literacy Level</b> | OR (95% CI)                            | p value | OR (95% CI)                                           | p value |
| Adequate                     | Reference                              |         | Reference                                             |         |
| Inadequate                   | 0.87 (0.34-2.19)                       | 0.76    | 0.96 (0.34-2.75)                                      | 0.94    |

<sup>a</sup>Adjusted for age, gender, race, marital status, tumor site, HPV status, treatment modality, and stage in treatment.

## 6 – CONCLUSION

### Health Literacy

- In the overall cohort, 17% of patients had inadequate health literacy
- ### Demographics and Clinical Characteristics
- Those with inadequate health literacy tended to be older
    - Consistent with previous literature demonstrating relationship between health literacy and age
  - Lower prevalence of oropharyngeal and HPV-positive cancer in those with inadequate health literacy
    - HPV is predominant cause of oropharyngeal squamous cell carcinoma
    - HPV positive cancer is associated with male sex, higher socioeconomic status, higher level of education, married

### Adherence to Clinical Recommendations

- Those with inadequate health literacy were less likely to complete PT but were equally as likely to complete SLP evaluation
  - Financial toxicity
    - ❑ PT requires more appointments than SLP, each requiring a co-payment
  - Importance
    - ❑ Issues regarding speech and swallowing may be perceived by patients as more debilitating than impaired neck mobility and pain
  - Poor understanding of benefits
    - ❑ Patients with inadequate health literacy may have poor understanding of how PT relates to HNC treatment

### Future Directions

- Prospective study to evaluate treatment related outcomes for patients with low health literacy versus patients with adequate health literacy
- Develop intervention to improve health literacy in at risk patients
- Explore interaction between health literacy and socio-economic status

## 7 – REFERENCES

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## 8 – ACKNOWLEDGEMENTS

UPMC’s Head and Neck Cancer Survivorship Clinic